Type 50R
Harmonic Restraint Relay

Application
The Type 50R, three phase harmonic restraint relay employs isolated input winding transformers that allow its use anywhere in the current string, unlike the conventional harmonic relay types employing input mixing transformers. This feature eliminates the cost and burden of additional auxiliary current transformers and makes its application ideal in the supervision of pilot wire, as well as differential, and overcurrent relaying. The Type 50R relay detects the presence of the second harmonic associated with transformer inrush current and will transfer its contact when the second harmonic current exceeds 15% of fundamental current. This percentage is factory set, but can be varied from 10 to 20% by an internal adjustment.

The harmonic restraint relay offers sensitivity as low as 0.87 amperes, a high continuous rating of 10 amperes, and a low burden of 0.03 ohms.

Features
- Sensitivity down to 0.87 amperes
- High continuous current rating of 10 amperes
- Low burden
- Seismic capability to 6g ZPA
- Transient immunity
- Drawout construction
- 2 year warranty

Figure 1: Typical Connections Type 50R Harmonic Restraint, Torque Control of Inst. O.C. Relay Type 50D
Specifications

Input Circuit Rating: 10A continuous
250A at one second

Burden: 0.03 ohms resistive

Control Voltage: 48, 110, 125 Vdc
0.03A maximum

Output Circuit Rating: 30 amp Tripping Duty
5 amps Continuous
1 amp Opening Resistive
0.3 amp Opening Inductive

Target Coil Circuit: 1 amp; withstand 30A, 1 sec.
.025 amp; withstand 10A, 1 sec.

Temperature Range: Minus 20° to Plus 70°C

Seismic Capability: More than 6g ZPA broadband
multifrequency vibration
without damage or
malfunction. (ANSI/IEEE C37.98)

Transient Immunity: More than 2500 V, 1 MHz
bursts at 400 Hz repetition rate
continuous (ANSI C37-90.1 SWC);
Fast transient test; EMI test.

Dielectric: 2000 Vac RMS,
60 seconds all circuits to ground.

Weight: Unboxed — 4.0 lbs. (1.8 kg)
Boxed — 4.7 lbs. (2.1 kg)

Volume: Boxed — 0.26 cubic feet

Figure 2: Relay Outline

How To Specify

Relay shall be Asea Brown Boveri Type 50R
harmonic restraint or approved equal, drawout
case, capable of withstanding up to 6g ZPA
seismic stress without damage or malfunction.

Built-in means shall be provided to allow oper-
ational tests without additional equipment.

How To Order

For a complete listing of available versions of
Circuit Shield harmonic restraint and overcur-
rent relays, see Selection Sheet 7.2.0.3.

Further Information

List Prices: PL 41-020
Technical Data: TD 41-025
Instruction Book: IB 7.2.1.7-6
Technical Paper: TP 18.0.4
Other Protective Relays:
Application Selector Guide, TD 41-016

December, 1991
December, 1991
New Information
Mailed to: E, D, C/41-100B

Device Number: 50

CIRCUIT SHIELD®
Type 50R
Harmonic Restraint Relay

Negative Sequence Time, Overcurrent, Three Phase (Device Number: 46, DB 41-172S)

<table>
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<th>Type</th>
<th>Continuous Rating</th>
<th>Time-Current Curve (k)</th>
<th>Freq</th>
<th>Control Voltage</th>
<th>Catalog Number</th>
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<td>8A</td>
<td>10-40</td>
<td>60 Hz</td>
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Internal Connections: 16D427B

Harmonic Restraint, 3-Input, Instantaneous Overcurrent, Three Phase (Device Number: 50, DB 41-173S)

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<th>Type</th>
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<th>Output Contacts</th>
<th>Control Voltage</th>
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Internal Connections: 16D420C

① Also for supervision of overcurrent and differential relays under inrush current conditions

Internal Connection Diagrams

16D427B Type 46Q Negative Seq. Overcurrent Relay Drawout Test Case

16D420C Type 50R Harmonic Restraint Relay Drawout Test Case

Notes: 1. TAR = series target coil.
2. Internal diode terminals 15-16 for testing use only.